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Carbon storage in Amazonian podzols

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It has recently been discovered that Amazonian podzols may store much larger quantities of carbon than previously thought, particularly in their deep Bh horizons (over 13.6 Pg for Brazilian Amazonia alone [1]). Similarly high carbon stocks are likely to exist in similar climate/soil areas, mainly in Africa and in Borneo. Such carbon stocks raise the problem of their stability in response to changes in land use or climate. Any significant changes in vegetation cover would significantly alter the soil water dynamics, which is likely to affect organic matter turnover in soils. The direction of the change, however, is not clear and is likely to depend on the specific conditions of carbon storage and properties of the soils. It is reasonable to assume that the drying of the Bh horizons of equatorial podzols, which are generally saturated, will lead to an increase in C mineralization, although the extent of this increase has not yet been determined. These unknowns resulted in research programs, granted by the Brazilian FAPESP and the French Région PACA-ARCUS and ANR, dedicated improving estimates of the Amazonian podzol carbon stocks and to an estimate of its mineralisability. Eight test areas were determined from the analysis of remote sensing data in the larger Amazonian podzol region located in the High Rio Negro catchment and studied in detail. Despite the extreme difficulties in carrying out the field work (difficulties in reaching the study sites and extracting the soils), more than a hundred points were sampled. In all podzols the presence of a thick deep Bh was confirmed, sometimes to depths greater than 12 m.

The Bh carbon was quantified, indicating that carbon stocks in these podzols are even higher than estimated recently [1].

References

1- Montes, C.R.; Lucas, Y.; Pereira, O.J.R.; Achard, R.; Grimaldi, M.; Mefli, A.J. Deep plant?derived carbon storage in Amazonian podzols. Biogeosciences, 8, 113?120, 2011.